



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: V2530-A5 SelectOne™ Upgrade Package BYPASS RATIO (-): 4.6  
 UNIQUE ID NUMBER: 04F10IA027 PRESSURE RATIO  $\pi_{co}$  (-): 32.0  
 COMBUSTOR: Floatwall  
 ENGINE TYPE: MTF RATED OUTPUT  $F_{oo}$  (kN): 133.0

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{oo}$ (mg/kN)	$LTO_{num}/F_{oo}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
LTO/ $F_{oo}$ AND MAX nvPM <sub>mass</sub>	838.3	7.69E+15	1766
AS % OF CAEP/10 LIMIT	-	-	30.7
AS % OF CAEP/11 LIMIT (InP)	46.9	65.7	
AS % OF CAEP/11 LIMIT (NT)	252.9	185.2	

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM <sub>mass</sub> ( $\mu\text{g}/\text{m}^3$ )
				EI <sub>mass</sub> (mg/kg)	EI <sub>num</sub> (particles/kg)	
TAKE-OFF	100	0.7	1.325	114.1	3.39E+14	
CLIMB OUT	85	2.2	1.078	215.4	9.91E+14	
APPROACH	30	4.0	0.387	320.5	2.73E+15	
IDLE	7	26.0	0.145	59.2	1.42E+15	
LTO TOTAL (kg, mg, number of particles)			517	80173	7.36E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ $F_{oo}$ VALUES (mg/kN, particles/kN)				603.1	5.53E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				450.3	2.87E+15	1372

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% $F_{oo}$ )	CORRECTED EMISSIONS INDICES	
		EI <sub>mass_SL</sub> (mg/kg)	EI <sub>num_SL</sub> (particles/kg)
TAKE-OFF	100	126.9	7.26E+14
CLIMB OUT	85	244.6	2.38E+15
APPROACH	30	380.6	7.97E+15
IDLE	7	80.3	6.37E+15

### AMBIENT CONDITIONS

	From		To		FUEL	
BAROMETER (kPa)	100.9	101.6	HEAT OF COMBUSTION (MJ/kg)		43.22	
TEMPERATURE (K)	275.8	278.2	HYDROGEN CONTENT (%mass)		13.83	
HUMIDITY (kg water/kg dry air)	0.0018	0.0025	AROMATICS CONTENT (%vol)		16.6	
			NAPHTHALENE CONTENT (%vol)		2.38	
			SULPHUR CONTENT (ppm by mass)		540	

MANUFACTURER: International Aero Engines  
 TEST ORGANIZATION: Pratt & Whitney  
 TEST LOCATION: East Hartford, CT  
 TEST DATES: 12/12/2016-14/12/2016

### REMARKS

1. Data from certification report IAE-0324
2. Engine performance reflects SelectOne™ and SelectTwo™ package upgrades
3. nvPM levels in accordance with Annex 16 Vol. II, Chapter 4, Appendix 7 and Appendix 8.
4. Data revised: fuel flows corrected